arisa

AI upskilling and reskilling: Key priorities & enablers

STAKEHOLDERS VIEWS FOR A SUCCESSFUL IMPLEMENTATION OF THE AI SKILLS STRATEGY IN EUROPE

31 July 2023

Co-funded by the European Union

Document details

AI upskilling and reskilling: Key priorities and enablers, 2023.

Deliverable D3.2 "Gathering stakeholders' needs & suggestions" / Status: DRAFT version.

This document version is subject to change after review coordinated by the European Education and Culture Executive Agency (EACEA).

Authors: Marie Montaldo (DIGITALEUROPE)

Reviewers: Stefania Aceto (Universidad Internacional de la Rioja), Aida Lopez Serrano (Universidad Internacional de la Rioja), Willemijn van Haeften (University of Applied Sciences Utrecht), José Usero (DIGITALEUROPE), Andreja Lampe (Chamber of Commerce and Industry of Slovenia), Ants Sild (BCS Koolitus).

Published date: 31 July 2023

Disclaimer

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Co-funded by the European Union

Revision history

Version	Date	Modified by	Comments
V0.1	25/07/2023	DE	First draft version for internal feedback
V0.2	28/07/2023	ARISA Partners	Revision of the document
V1	31/07/2023	DE	Final version

Project information

The Artificial Intelligence Skills Alliance (ARISA) fast-tracks the upskilling and reskilling of employees, job seekers, business leaders, and policymakers into AI-related professions to open Europe to new business opportunities. It is a four-year transnational project funded under the EU's Erasmus+ programme. For more information, contact info@aiskills.eu | aiskills.eu

Project Partners

List of abbreviations and acronyms

AI	Artificial Intelligence
ARISA	Artificial Intelligence Skills Alliance
CWA	CEN Workshop Agreement
D	Deliverable
EC	European Commission
eCF	European e-Competence Framework
ESCO	European Skills, Competences, and Occupations
EU	European Union
ICT	Information and Communications Technology
NGO	Non-Governmental Organisation
SME	Small and Medium-sized Enterprise
SO	Strategic Objective
VET	Vocational Education and Training

Table of contents

1. EXECUTIVE SUMMARY 6

1.1. INTRODUCTION 6
1.2. OBJECTIVES 6
1.3. METHODOLOGICAL APPROACH 6
1.4. RESULTS 6
1.5. CONCLUSIONS 8
1.6. RECOMMENDATIONS 8
1.7. USE OF THIS DOCUMENT 9

2. METHODOLOGY 10

2.1. QUESTIONNAIRE 10
2.1.1. Goals and methodology 10
2.1.2. Characterisation of the respondents 11
2.2. FOCUS GROUP 12
2.2.1. Goals and methodology 12
2.2.2. Characterisation of the group of participants 13

3. RESULTS 13

3.1. RESULTS OF THE QUESTIONNAIRE 14
3.1.1. Effectiveness of the AI upskilling and reskilling 14
3.1.2. Key sectors and actors driving AI skills development 15
3.1.3. Priority areas for the AI Skills Strategy implementation 16
3.1.4. Key enablers for the development of AI skills in Europe 17
3.1.1. Best fitted funding schemes 17
3.1.2. Best strategies to be/keep up to date on AI 18
3.1.3. Discussion of the questionnaire input 19
3.2. RESULTS OF THE FOCUS GROUP 20
3.2.1. AI learning offerings: How to ensure their relevance and uptake 20
3.2.2. Stakeholders: How to involve them long-term at different stages 21
3.2.3. Artificial Intelligence: How to promote its use and increase trust 22
3.2.4. Discussion of the focus group input 22

4. RECOMMENDATIONS 23

5. CONCLUSIONS 24

6. ANNEXES 25

6.1. ANNEX 1: QUESTIONNAIRE STRUCTURE 25
6.1.1. Identification section – About you 25
6.1.2. AI Skills Strategy and drivers 26
6.2. ANNEX 2: FOCUS GROUP PROCEEDINGS 29
6.2.1. Agenda 29
6.2.2. Participants 29
6.2.3. Focus group Proceedings 30

List of figures

Figure 1: ARISA input to the European AI Skills Strategy *10*
Figure 2: Geographical representation of the respondents *11*
Figure 3: Importance of AI skills for the professional future of the respondents in the next 5 years .. *12*
Figure 4: ARISA's initial strategic objectives *12*
Figure 5: Main actors to drive the implementation of the European AI Skills Strategy *16*
Figure 6: Areas to be prioritised in the implementation of the European AI Skills Strategy *16*
Figure 7: Key enablers associated to the development of AI skills in Europe *17*

1. Executive Summary

1.1. Introduction

In the context of the ARISA project, this report (D3.2) aims at gathering stakeholders' insights, good practices, and recommendations for the enhancement and validation of the general approach of the AI Skills Strategy for Europe, which will be released in Autumn 2023.

It is to be noted that the outcomes of this stakeholder consultation complement the conclusions of the AI Skills Needs Analysis report (D2.2), the results of the analysis of good practice examples and transferable elements of policies, initiatives, and projects enabling the AI upskilling and reskilling in the EU (D3.1), and the information provided by the Advisory Board members and partners of the ARISA project during the feedback rounds.

1.2. Objectives

The objective of this report is to structure the input received via the stakeholder consultation methods used and cross-analyse it to provide further input, suggestions, and recommendations for the maturation of the European AI Skills Strategy. The recommendations aim to underline the good practices, priority areas, and further supporting actions for stakeholders and the ARISA partners to ensure the successful implementation of the AI Skills Strategy in Europe and its sustainability after the project end in 2026.

1.3. Methodological approach

Two methods were used to gather the views of stakeholders, namely an online questionnaire and a focus group. On the one hand, the online questionnaire helped determine the key priorities and factors that facilitate the successful implementation of the European AI Skills Strategy at the national and the EU levels. On the other hand, the focus group aimed at studying and further refining the initial strategic objectives and supporting actions of the European AI Skills Strategy, formulated by the ARISA partners.

1.4. Results

The data collected by the two-method approach are summarised as follows:

Research method	Data collected
Online questionnaire	81 responses
Focus group	20 participants

The main findings of the online questionnaire are:

- The majority of the 81 respondents are from Northern European countries and are between 35-54 years old with a higher education background. Most of them work in one of the following sectors including Education, Information and Communication, and Consultancy, Marketing, Accounting and Legal services.

- The majority of respondents are somewhat familiar with the basic principles of AI but 96.3% estimate that AI skills are likely to become important for their professional future in the next 5 years.
- Most do not have an opinion or are not aware of the efforts being made in their countries to promote and develop AI skills. But, for those who have an opinion, 71.74% consider the efforts are limited or inadequate.
- The Technical, Engineering, and R&D activities sector is seen as the most critical area to drive AI skills development across European countries.
- Governments and public organisations are perceived as the main drivers for the implementation of the European AI Skills Strategy in European countries, working hand-in-hand with, notably, education and training organisations.
- The creation of AI education and training programmes was found to be the main priority area for the implementation of the European AI Skills Strategy. Collaboration between education and industry is also seen as another key enabler that works in synergy.
- Respondents reported that National government grants and funding programmes are the most suitable funding schemes to considerably help successful implementation of the European AI Skills Strategy. European grants and funding programmes are seen as a relevant secondary funding source.
- To keep people informed about AI in business and policy contexts, already existing online and offline sources of information (e.g., social networks, fora, books, events) are seen as effective, however, respondents emphasised the trustworthiness and reliability of these sources.

The main findings of the focus group are:

- The group of participants was composed of 20 experts from 14 European countries. About one third were women and two third were men.
- Participants agreed that the AI learning offerings need to be updated regularly, but it has been underlined that the focus of these updates should be placed on the most critical priority elements (i.e., skills needs that persist).
- One participant suggested that the analysis to identify AI skills mismatches in the EU can be extended to other relevant datasets that could support the identification of megatrends.
- Participants highlighted that the AI upskilling and reskilling offerings should offer foundational AI skills and further learning pathways/tracks for more advanced roles.
- Creating EU standards with certification frameworks and accreditation procedures that can be managed at Member State level were discussed and it was strongly suggested that the starting point should be a CEN Workshop Agreement.
- All participants agreed that systematic collaboration between industry and education can facilitate better alignments between the AI skills needs and the educational offerings across the EU. The desire of companies and learning providers lie in improving the already existing knowledge-sharing mechanisms and feedback loops by finding the right incentives.
- Participants emphasised the fact that the promotion of AI should be about transparency. They explicitly underlined that the focus can be on educating people about the opportunities it brings and threats it can pose.

- Developing an "aware" culture of AI was mentioned to promote and demystify AI, especially engaging people from an early age (e.g., in schools).

1.5. Conclusions

The main takeaways of this report provide necessary feedback and insights on the initial structure, strategic objectives (SOs), and supporting actions of the European AI Skills Strategy to guide its maturation. The main conclusions are:

- The methodological approach and research methods used to gather input on the European AI Skills Strategy's initial structure, as well as priorities, key enablers, and factors for its future implementation at the national and EU levels have proven to be adequate and the extensive data collected relevant for the purposes of the research.
- The analysis and discussions of the data collected through the two methods offer solid input that can be used as background information for the further planning, development and implementation of the European AI Skills Strategy. This information can also support the ARISA Alliance in rolling out the Strategy at the national level.
- The recommendations drawn are key practical pieces of advice that result from the main findings and discussion of the research. They can be used to mature the European AI Skills Strategy and more specifically refine the initial structure of the SOs and associated supporting actions.
- The main outcomes of this report together with the outcomes of D.3.1 constitute a useful and solid input for planning the ARISA Strategy, defining relevant SOs and key tasks for the ARISA Alliance.

1.6. Recommendations

The following recommendations are the practical pieces of advice that will be taken into account when maturing the European AI Skills Strategy and in particular its strategic objectives and supporting actions. They may also be retained, as pointers, in the context of the different work packages, tasks and activities of the ARISA project.

The main recommendations on **collaborating in the field of AI** are:

- Fostering cooperation between government, academia, industry, and society in developing suitable AI learning offerings.
- Cooperation between experts from governments, corporates, SMEs, and AI-related professionals when defining the most sought-after skills in AI and use AI-powered tools.
- Providing an online community space for policymakers, industry, academia and NGO representatives, educators, and learners to share trustworthy and reliable information on AI.

The main recommendations on **educating and training** are:

- Developing AI curricula and programmes with foundational skills for all and more defined learning pathways for AI technical roles.
- Developing introductory materials to demystify AI for all and more particularly for school pupils.

The main recommendations on **sustainability** are:

- Identifying and using National governments' grants and funding programmes and EU funding schemes to finance the implementation of the European AI Skills Strategy in EU countries.
- Advocating for new funding lines towards National governments to roll out the European AI Skills Strategy at the national level.
- Regular updating of curricula on AI in line with the technological developments that are identified as consistent over time.
- Participating in the discussion and work of EU standardisation bodies to support the elaboration of robust AI-related professional role profiles, through a CEN Workshop Agreement (CWA).

1.7. Use of this document

The main use of this document is to inform the further development of the European AI Skills Strategy, which will be released in Autumn 2023. It can further be used by government, industry, and education and training representatives to get insights into the key factors and enablers of effective skills development strategies, and to understand how to promote and build trust in AI. It offers as well valuable insights into how to become or keep up to date with AI developments.

2. Methodology

Two methods were used to gather and include the views of stakeholders in the preparation, enhancement, and validation of the general approach of the AI Skills Strategy for Europe, which will be released in Autumn 2023, including an online questionnaire and a focus group. This chapter presents each method and further describes the goals, methodologies, and characterisation of the respondents and participants.

It is to be noted that the outcomes of this consultation complement the conclusions of the AI Skills Needs Analysis report (D2.2), the results of the analysis of good practice examples and transferable elements of policies, initiatives, and projects enabling the AI upskilling and reskilling in the EU (D3.1), and the information provided by the Advisory Board members and partners of the ARISA project during the feedback rounds.

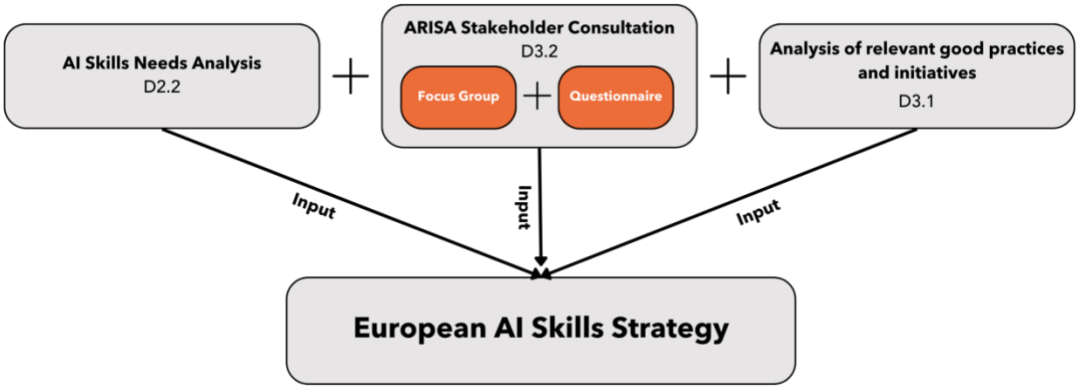


Figure 1: ARISA input to the European AI Skills Strategy

2.1. Questionnaire

2.1.1. Goals and methodology

The main aim of the questionnaire was to determine the key priorities and factors that facilitate the successful implementation of an AI Skills Strategy throughout the EU, and therefore formulate recommendations for its further development. The questionnaire was designed to gather insights and feedback from stakeholders on the factors that contribute to the effective implementation of the strategy (see Annex 1) namely the perceived key sectors driving AI skills development, the priority areas, key enablers, and main drivers for the implementation and the relevant funding schemes at the local, national, or EU level.

Since the geographical scope of the AI Skills Strategy is European, the questionnaire allowed responses from any of the Erasmus+ Programme countries and associated third countries[1], as of July 2023.

[1] Erasmus+ Programme – Eligible countries: https://erasmus-plus.ec.europa.eu/programme-guide/part-a/eligible-countries

The data gathered derives from a quantitative survey administrated online via EUSurvey and has been disseminated through the respective networks of the members of the ARISA consortium and beyond. The group of respondents has been built following the probability sampling method while keeping in mind that the main targets were professionals who perceived AI skills as important for their careers. The questionnaire has taken place between the 3rd and the 16th of July 2023.

2.1.2. Characterisation of the respondents

Among the 81 respondents, we can say that the group was almost equally composed of men (48.15%) and women (46.91%), with 4.94% preferring not to disclose their gender. Most of our respondents have attained a high degree of education with 53.09% having a master's degree, followed by bachelor's degree (20.99%) and doctorate (16.05%). People with no higher education are represented to a lesser extent (7.4%), including those who preferred not to disclose this information (2.47%). In terms of age groups, the majority of people are in the 45 to 54 age range (27.16%), followed by those between 35 and 44 (23.46%), 55 and 64 (22.22%) and 25 and 34 (20.99%). The least represented age groups (in total 6.17%) were those over 65 and between 18 and 24 – both of which are the least integrated into the labour market."

From another viewpoint, it is important to highlight that most of the survey's respondents have indicated that their country of residence is Ireland (25.93%) and that Northern European countries are being the most prominently represented with a total of 38.27% (see figure 2). The same question also includes residents from Central and Eastern European countries – Slovenia (18.52%), Poland (6.17%), Hungary (2.47%), and Bulgaria (1.23%) – and Western and Southern European countries including the Netherlands (11.11%), France (2.47%), and Belgium (2.47%) and Italy (7.41%), Greece (4.94%), Spain (2.47%), and Portugal (1.23%). The rest of the respondents indicated residing in Northern European countries – Estonia (9.88%), Iceland (1.23%), and Denmark (1.23%) as well as third countries associated to the Erasmus+ Programme, namely Turkey (1.23%).

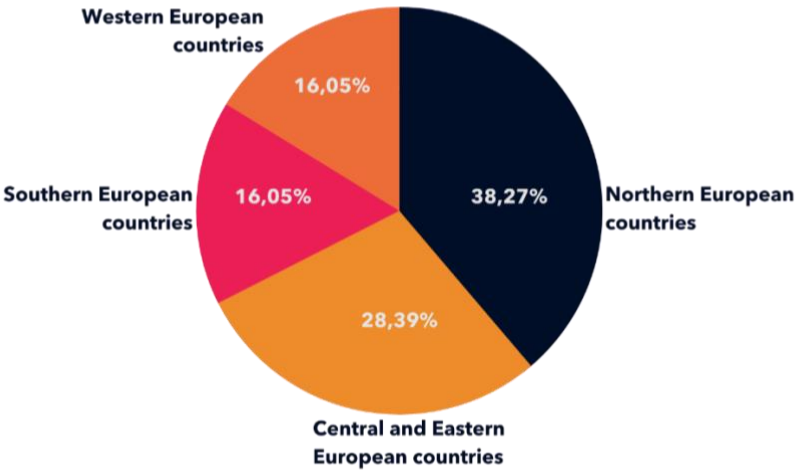


Figure 2: Geographical representation of the respondents

Almost all respondents are currently working (98.3%) and the most preeminent sectors of activity represented are Education (31.2%) followed by Information and Communication (14.9%). To a lesser

extent, people are working in the consulting, marketing, accounting and legal services sector (11.8%) and the sector composed of technical, engineering and R&D activities (10.7%). Other minority sectors represent a total of 28.2%, including Public administration and defence, Transportation and storage, Water supply, sewerage, waste management and remediation activities, Human health and social work activities, Administrative and support service activities, Construction, Manufacturing, Financial and insurance activities as well as "Other".

Regarding familiarity with the basic principles of AI, the majority of people think that they are only somewhat familiar (51.85%), or very little (16.05%), and not at all (2.47%). Meanwhile, only 29.63% think that they are very familiar with the basic principles for the use of AI. While we can conclude that 70.37% are not totally familiar with the basic principles of AI, the majority of the respondents estimated that AI skills will most likely become very important (59.26%) or important (37.04%) for their professional future in the next 5 years. Only 3.7% of the respondents believe that AI will be of little or no importance professionally.

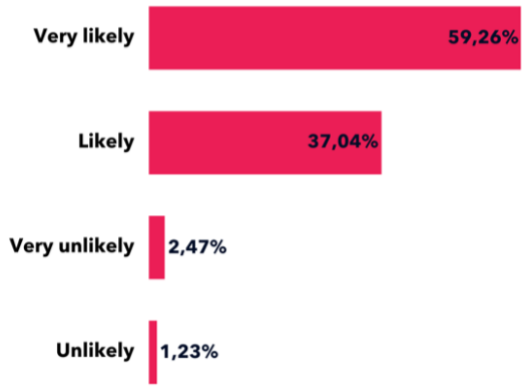


Figure 3: Importance of AI skills for the professional future of the respondents in the next 5 years

2.2. Focus Group

2.2.1. Goals and methodology

The main goal of the qualitative research was to study and further refine the initial strategic objectives (SOs) and supporting actions of the European AI Skills Strategy, formulated by the ARISA partners.

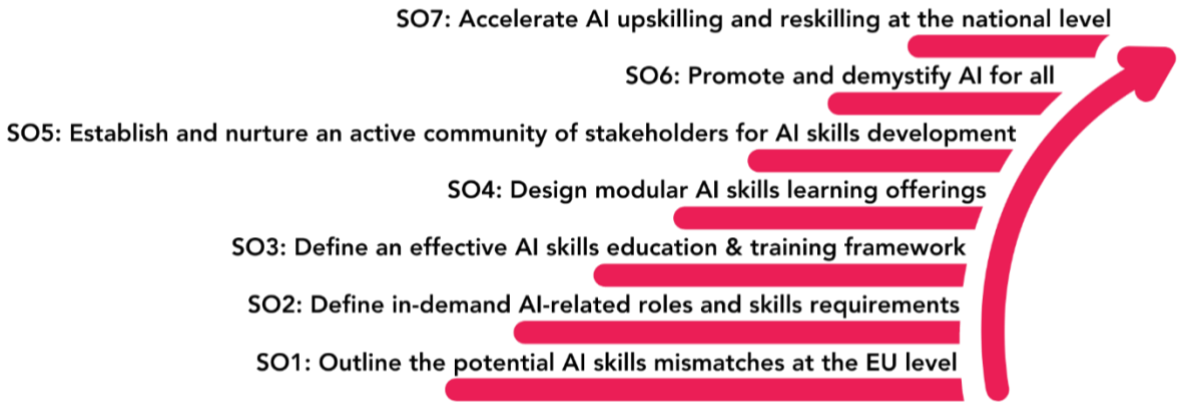


Figure 4: ARISA's initial strategic objectives

The focus group looked at specific elements (see Annex 2) including what are the complementary supporting actions for each SO, what learning programmes should be delivered more urgently and how to localise them efficiently, how to create an effective AI skills framework and ensure synergies with existing European frameworks and standards, how to widen access to AI learning offerings and reach non-technical people, what are the best ways to create a solid AI community, and how to promote trustworthy AI.

The focus group was organised on Tuesday the 11th of July 2023 from 10:00-12:00 CEST/Brussels time, via Microsoft Teams. Participants were invited through the respective networks of the members of the ARISA consortium and with a view to gathering policymakers working on topics such as AI/tech, employment, or education, large and smaller organisations with AI skills and knowledge needs (including Human Resources and C-level manager), civil society organisations, as well as learning providers with an education or training offering in the field of ICT. They were selected based on their organisation location to cover as many EU Member States as possible and include organisations that are not part of the ARISA consortium.

For the preparation of the focus group, participants received comprehensive documentation before the meeting. The AI Skills Needs Analysis report, together with the link to the interactive AI-powered skills maps (one of the outcomes of the job vacancies analysis of the AI Skills Needs Analysis) which allows to visualise strings of connected skills and showing which skills are the most closely related to a specific skill or role, was shared. During the meeting, and as an introductory section, participants learned more about the ARISA project as a whole and the key results from the AI Skills Needs Analysis.

2.2.2. Characterisation of the group of participants

The focus group was composed of 20 experts from 14 European countries including 2 from Belgium, 1 from Estonia, 1 from Finland, 1 from France, 3 from Greece, 1 from Hungary, 1 from Ireland, 3 from Italy, 1 from The Netherlands, 1 from Poland, 1 from Portugal, 1 from Romania, 2 from Slovenia, and 1 from Spain. They represented industry (35%), civil society (15%), and the education and training (25%) and public (25%) sectors. They gave their input on strategies to increase Artificial Intelligence knowledge and skills in Europe.

Among the 20 participants, about one-third (7 persons) were female and two third (13 persons) were male. 70% of the participants held a "high-level executive" position in their organisation, i.e., are Director or above and/or a professional who may not oversee other employees but who has specialised knowledge in a particular field – in this case, it includes AI, Business development, Technology, and Innovation.

3. Results

The multi-method approach led to extensive data collection. The results are presented in this chapter for each singular method and organised under sub-chapters that are related to the research goals pursued.

3.1. Results of the Questionnaire

The results derived from the analysis of the questionnaire provide valuable insights into key priorities and factors that facilitate the successful implementation of an AI Skills Strategy across the EU.

3.1.1. Effectiveness of the AI upskilling and reskilling

Most of the respondents are neutral with reference to the efforts being made in their country to promote and develop AI skills (43.21%), suggesting that they either do not have an opinion or are not aware of the efforts being made in their country. Among the rest of the group of respondents[2], the large majority (71.74%) agree that the efforts currently deployed in their respective country are insufficient[3]. Moreover, it is interesting to note that among that latter group, most work in the sectors of Education (33.33%), Consultancy, marketing, accounting, and legal services (18.18%), and Technical, engineering and R&D activities (15.15%).

Proportionally to the total of respondents for each sub-regions of the European Union[4] who have chosen any other options than "Neutral" to the question, 100% of people from Southern European countries estimate the efforts are insufficient. And this feeling is shared among respondents from all other sub-regions including, Eastern European countries (71.42%) and Northern and Western European countries (66.67% each).

While we cannot divert the fact that the respondents give a subjective and perhaps incomplete view on the topic, we can still argue that there is a real need for efficient and attractive upskilling and reskilling efforts that could be more harmonised across the EU and cover the main fields of application for AI[5] identified in the AI Skills Needs Analysis in the short and medium-long term.

Derived from the same question, some respondents commented on the reason of their choice. Among those who have a positive view on the effort and progress of AI skills development in their country, it is worth highlighting they note a gradual shift in the way AI skills development is addressed by government, companies, and education and training.

> *"Across the country, there are more programmes to develop core competencies in AI."*
>
> *"Within the professional sectors, efforts are being made to get more citizens to retrain and upgrade their skills."*
>
> *"There is a government policy driving the effort to develop AI skills, supported by third-level institutions and corporate training agencies."*

[2] The rest of the group of respondents corresponds to the total of the respondents who have chosen any other options than "Neutral" to the question "Please rate the effectiveness of the current efforts to promote and develop AI skills in your country", i.e., 46 respondents out of the group of 81 respondents.

[3] This total includes respondents who estimated that the effectiveness of the current promotion and development of AI in their respective countries were "Not effective at all" or "Slightly effective".

[4] See figure 2 "Geographical representation of the respondents.

[5] According to the 2023 ARISA AI Skills Needs Analysis report, the most frequent fields of application for AI are Research and Development, New product development, Operations, Customer services, Marketing, Security, Human Resources, and Legal/Compliance. See p.21: https://aiskills.eu/resource/europes-most-needed-ai-skills-and-roles/

"The Netherlands has the NLAIC, which promotes "human capital" to develop AI skills."

Among those who estimate that the efforts are limited or inadequate, most are critical vis-à-vis the contribution of governments and the education and training sector. Lack of funding or level of maturity in the development of AI upskilling and reskilling initiatives are both highlighted as key blockers.

"There is a lack of initiatives and funding at the national level in education."

"There is no legal accelerator to use AI and no popular courses for mid-market companies to engage with AI."

"There doesn't seem to be any effort being made in this direction."

"Very limited state programs for AI competency development."

"Some initiatives are expensive and not affordable for everyone."

"Efforts between the government and the education sector are misguided, with a well-designed program but poor delivery."

"There is no strategic plan or ownership, and limited understanding and commitment to evolve."

"There does not seem to be a coherent and transparent campaign to make AI a strategic capability and promote its ethical use."

3.1.2. Key sectors and actors driving AI skills development

Respondents mainly identified Technical, engineering, and R&D activities sector (34.61%) as key in driving the development of AI skills. This was followed by others not defined and at a great distance by Public administration and defence (12.44%) and the Arts sectors (11.12%). In a third minority group, the Agriculture, forestry and fishing; Electricity, gas, steam and air conditioning supply; and Real estate sectors were mentioned.

Proportionally to the total of respondents for each sub-regions of the European Union[6], these results seem to be quite consistent across geographical locations with 26.1% from Eastern European countries, 38.46% from Western European countries, 35.48% from Northern European countries, and 38.46% from Southern European countries identifying Technical, engineering, and R&D activities as critical.

Given the results, we may conclude that sectors where the use of AI technology, regardless of the geographical location, are more likely to drive innovation and support the activities are those which are the more likely to give momentum to AI skills development initiatives due to their inherent needs for people with AI skills in different roles.

Additionally, it is worth noting that 61.73% of respondents identified government and public organisations as main actors to drive the implementation of the European AI Skills Strategy in their country. Followed by Education and training organisations (27.16%), and by the group that believes

[6] See figure 2 "Geographical representation of the respondents.

that other organisations and companies (i.e., NGOs, companies, and industry representative bodies) should be responsible for this implementation (7.41%). However, the results cannot be taken independently, and it seems evident that these main actors must be complementary to each other. Figure 5[7] shows the relative perceived importance of the different actors in ensuring the implementation of the European AI Skills Strategy. The AI Skills Strategy should therefore tend to define specific supporting actions for its implementation that is directly addressed at government and public organisations as well as Education and training organisations as a priority.

Figure 5: Main actors to drive the implementation of the European AI Skills Strategy

3.1.3. Priority areas for the AI Skills Strategy implementation

An unequivocal majority of the respondents (74.1%) highlighted that the "Creation of AI education and training programmes" area should be given the highest priority in the implementation of the European AI Skills Strategy. Far behind is the area of boosting upskilling and reskilling initiatives for the workforce (17.2%), followed by other areas that do not reach 4%. According to these results, we could conclude that one of the key strategic objectives and outputs of the AI Skills Strategy and the ARISA project should be to design AI education and training programmes that could be rolled out across Europe.

Figure 6: Areas to be prioritised in the implementation of the European AI Skills Strategy

[7] The data derived from a multiple-choice question that enabled the respondent to tick multiple answers, thus the sum of all the percentages is higher than 100%.

3.1.4. Key enablers for the development of AI skills in Europe

The main key enablers identified for the development of AI skills in Europe are the collaboration between education and industry (51.86%), and the creation of AI-specific educational programmes and courses (38.28%). However, these enablers are associated with each other as can be seen in the following figure, the main ones being those appearing on the ordinate axis. It should be noted that Company incentives for AI professional certifications, should go together with Collaboration between education and industry actors, and Support for AI-related start-ups and entrepreneurship.

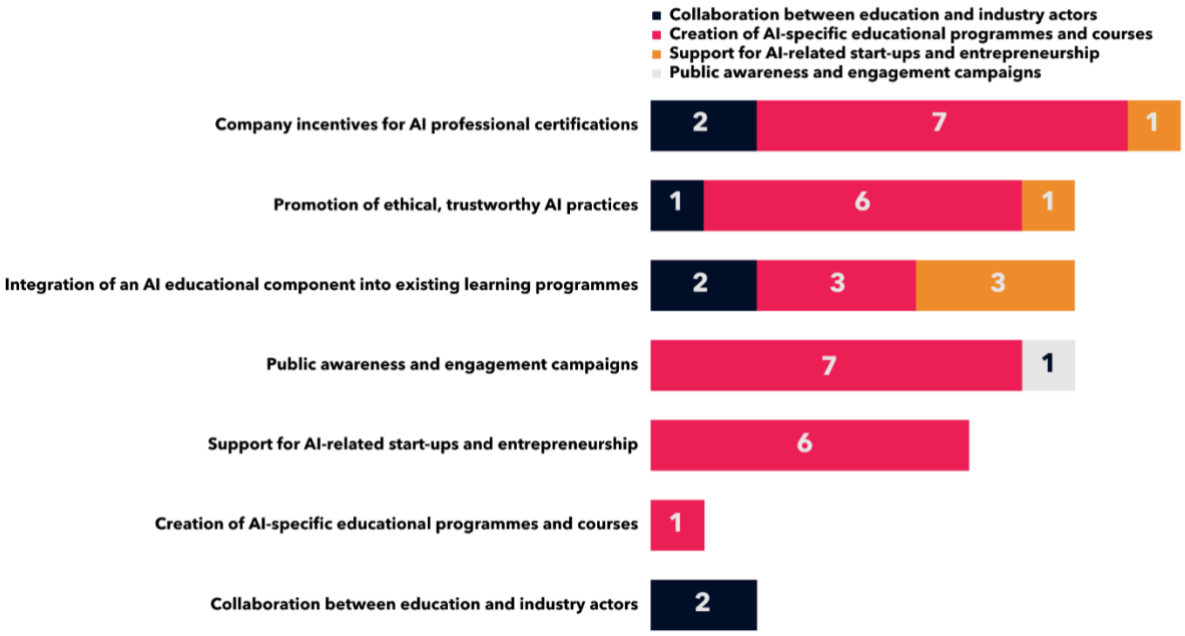


Figure 7: Key enablers associated to the development of AI skills in Europe

In addition, respondents have proposed other suggestions they consider relevant including i) introducing appropriate educational content on AI as a domain in curricula from the most basic levels in schools, ii) utilising projects using AI in social contexts, and iii) less regulatory barriers. They also warned about the scaremongering in the media – qualifying it to be counterproductive.

3.1.1. Best fitted funding schemes

According to the majority of respondents (66.7%), the financing for the implementation of the European AI Skills Strategy should be carried out mainly via National government grants and funding programmes. As for those who think that it should be funded by European grants and funding programmes, they represent 29.6%. The group of people who believe that it should be funded by other means of financing including venture capital funds, industry grants and sponsorships and programmes of local development, is in the minority (4.93% in total).

The results show that respondents think that the implementation of the European AI Skills Strategy should be anchored in the national strategy of their countries. Its success is therefore dependent on the drive generated and emphasis put by governments on the necessity of further developing AI upskilling and reskilling activities. Still relevant, the EU contribution could fuel the momentum around the development of AI skills in Member States but represent a secondary funding source.

3.1.2. Best strategies to be/keep up to date on AI

People were asked about the best ways to stay (or become) informed on AI in a business or policy context. This question serves to understand what could be the most appropriate communication channels or actions to achieve higher levels of understand of AI across the EU.

Respondents listed online and offline sources (e.g., books, reports, online forums), social networks such as LinkedIn or Twitter, or events and conferences as great sources of information about AI. However, it is important to highlight that multiple respondents also underlined the importance of fact-checking and paying attention to the type of sources used which should be trustworthy and reliable.

> *"Consuming dedicated/carefully curated information, especially through videos on platforms like YouTube."*
>
> *"Following trusted publications and participating in relevant training programmes"*
>
> *"Consulting reliable online sources and avoiding echo chambers or bubbles"*
>
> *"Organising AI events, interactive sessions, and introductory workshops to engage people of all backgrounds"*
>
> *"Joining AI-related forums, web portals, and collaborative social networking platforms"*

Beyond common media channels, respondents hinted at the fact that there is a need to generate knowledge on AI that could be shared easily, e.g., through web portals, social networking platforms, or communities, by companies, public organisations, or governments and offer more centralised sources of knowledge.

> *"Creating centralised platforms at the EU level for AI-related information."*
>
> *"Developing knowledge through professional bodies and specialised AI institutions."*
>
> *"Building repositories of use cases and AI best practices."*
>
> *"Creating a community of practice to share knowledge and encourage innovation."*

Education and training were also listed as two important pillars for being and keeping informed about AI. Specific aspects were highlighted such as getting certifications, designing and implementing AI training courses, or engaging in educational initiatives and working groups (e.g., EU Hub). Knowledge about AI and policies should be made accessible to everyone.

> *"Promoting education and awareness of AI, even for specific target audiences like HR managers."*
>
> *"Encouraging public dialogue, knowledge sharing, and public events to inform citizens about AI."*
>
> *"Making public policy-level summaries of AI progress and sharing them with the public."*

"Drafting manifestos to establish ground rules for AI and ensuring they are easily understandable"

3.1.3. Discussion of the questionnaire input

The following aspects, extracted from the analysis of the questionnaire data, are to be considered as background information for the planning, development, and implementation of the European AI Skills Strategy.

- The data indicates that initiators of activities to promote and develop AI skills in Europe are currently rather unsuccessful in achieving their objectives. Current initiatives need to be more visible and more accessible to the general public.
- Across the EU, current initiatives aimed at promoting and developing AI skills need revision to better meet the expectations of stakeholders – especially those working in the education sector.
- Data shows that across the EU, sectors where AI technology is used are those that are more likely to give momentum to AI skills development initiatives due to their current needs for skilled professionals in the field of AI.
- Promoting a whole-of-society approach, driven by governments, is a key element in more successful initiatives and for the implementation of the European AI Skills Strategy at the national level, including focusing on "core" AI skills to be developed. An example given is in the Dutch NLAIC which is an initiative of industry representative bodies, the Dutch Ministry of Economic Affaire and Climate Policy, scientific organisations, and companies collaborate to accelerate and connect AI developments and initiatives.
- The creation of more AI educational and training programmes across the EU is a critical element to drive the implementation of the European AI Skills Strategy at the national level. The AI educational programmes and courses is to be jointly created by industry and education actors.
- Governments are to increase funding opportunities at the national level to develop efficient and attractive AI upskilling and reskilling activities and consider embedding AI in their strategic actions.
- Governments grants and funding programmes are the primary and most adequate source of financing for stakeholders to develop and implement the European AI Skills Strategy. EU grants and funding programmes are found to be a suitable secondary source of financing for stakeholders to develop and implement the European AI Skills Strategy.
- Based on the data collected, it can be concluded that trustworthiness and reliability of sources are two of the key elements to pay attention to as consumer of information on AI.
- A crucial element is the focus on education and training for becoming or staying up to date on AI developments.

3.2. Results of the Focus group

3.2.1. AI learning offerings: How to ensure their relevance and uptake

AI learning programmes need to be agile and modular to facilitate fast-paced delivery and change as the AI landscape is developing very quickly[8]. Although it is generally acknowledged that learning programmes should be updated faster and more efficiently to reflect the technological advancements, it is recommended that the focus of these updates should be placed on the most critical priority elements. Elements that are mature enough to be considered relevant in the long-term rather than elements that are more ephemeral trends or still at an initial stage of development. In this way, components of the AI learning offerings could be adapted or added regularly to programmes and would therefore ensure they are relevant for learners, the labour market, and the society at large.

> *"What we are talking about today will be very different in a year from now. What is going to remain with us? What is in a developing phase, and what will be dropped? We should focus on the things that are going to stay with us. That is the challenge." – Expert 13*

To identify critical priority elements, in-depth, regular analysis of the AI skills job requirements and trends (i.e., Skills Needs Analysis and forecast) using a multi-method approach, e.g., job vacancies analysis, expert focus groups, desk research, and questionnaires is considered a valid process. The analysis can be extended to other relevant datasets that could support the identification of megatrends such as company investments in AI and research and innovation.

> *"Open the analysis from job posting to research, investments – those types of datasets that can also be valuable for us and tell us where is the interest of corporates and organisations in the near future." – Expert 6*

Beyond giving priority to the more mature elements in the updating of learning programmes, participants suggested that the development of the AI learning offering should be adaptative to a diverse group of profiles according to the professional roles' skills requirements. It is a given that AI technical professionals should have a more comprehensive and specialised AI skillsets than AI non-technical professionals. In this view, it was recommended to focus on core AI skills at the beginning of the training (i.e., fundamental data skills), especially for people who don't require a substantial level of AI knowledge in their (future) role, and then have different, more specialised learning paths for those who want to deepen their knowledge and/or become AI professionals.

While this is already somewhat reflected in the currently available AI learning offerings whereby one can learn about broader and more specific AI skills and competences, the AI Skills Needs Analysis[9] uncovered the lack of available AI skills programmes for policy and decision-makers and the need to identify a more robust skills profile for AI professionals, including soft skills.

[8] ARISA, AI Skills Needs Analysis report, 2023. https://aiskills.eu/resource/europes-most-needed-ai-skills-and-roles/
[9] Ibid.

"We focus on the things that do not get "old" so quickly which are more fundamental skills. We try to move away from this distinction between soft skills and hard skills." – Expert 5

Identifying relevant roles and their skills requirements to define a relevant AI skills framework and related educational profiles seem to be key aspects to ensure adequate learning paths for AI technical and non-technical roles as well as accelerate the development of a relevant AI learning offering. European skills, competences, and occupations frameworks such as eCF[10] and ESCO[11] are currently incomplete when it comes to AI-related roles. It is therefore important to consider how to facilitate their harmonisation and localisation, using, for instance, EU common standards with certification frameworks and accreditation procedures that can be managed at Member State level.

3.2.2. Stakeholders: How to involve them long-term at different stages

Lack of cooperation between businesses and learning providers can lead to discrepancies between the labour market's expectations and the skills of learners. To remedy this issue, it is important to create and maintain appropriate collaboration avenues that can facilitate better alignments between the AI skills needs and the educational offerings across the EU.

"If the learning providers are not fulfilling the needs of companies, it won't work." – Expert 1

Several feedback loop and knowledge-sharing mechanisms already exist (e.g.., roundtables, focus groups, consultations) and should not be discarded, however, it seems that the desire of both companies and learning providers lie in improving these processes to make them better fit-for-purpose, i.e., agile, and deliver the right incentives (or remove the underlying frictions to get involved) to achieve a win-win relationship that can last in time.

"[It can be] the old ways, like roundtables, but make that a dynamic model so we can really create sustainability and a win-win model." – Expert 6

Furthermore, to ensure a long-lasting relationship between stakeholders that brings the expected results, it is important to concentrate efforts on identifying the right interlocutors and ensuring the perspectives collected accurately reflect different parties' viewpoint. In the case of AI, speaking with technologists, managers of AI technical professionals, and policymakers is paramount to validate the AI skills needs and trends – not to forget the end-users who can be represented by representative bodies and associations.

"Talk to stakeholders in different organisations where the solutions are deployed. These are organisational stakeholders but also, in my case, end-users – people who are exposed to these." – Expert 5

"[We have] in-depth exchange with someone who is working in an AI role or leading an AI team and the information we get there is a lot more qualitative and gives us a clearer idea of what specific mismatches exist." – Expert 15

[10] CEN/TC 428, the "e-Competence Framework" – EN 16234-1:2019, 2019. https://ecfexplorer.itprofessionalism.org/

[11] European Commission, European Skills, Competences, and Occupations classification. https://esco.ec.europa.eu/en

"[Include] politicians and lawyers to understand how Members States, governments, could approach these AI trends." – Expert 9

3.2.3. Artificial Intelligence: How to promote its use and increase trust

Educating people about AI is key to increase trust in the technology and bolster the use of AI in companies and at work. Misinformation and disinformation about what AI can and cannot do is proliferating which in turn weakens trust in the opportunities it can open. Lack of clarity about what would be the impact of AI on the workforce and the job market can even bring distrust in the technology and slow down its uptake in diverse contexts.

For experts, it is clear that promoting AI should be about transparency. It is about educating people about the opportunities it can bring and the threats it can pose. It is about teaching the skills that will be needed to use AI technology in business and policy contexts, taking into account privacy, bias, and trust.

"We need to build culture [and] a mechanism that can bring people to use AI and let them know there are problems but also opportunities in AI. We have to stress the fact that there are good and bad sides. We cannot hide anything." – Expert 2

Further than debunking "fake news" about AI, the emphasis should be put on promoting and raising awareness about the added value of AI and present real-life examples of its benefits in different contexts – to the general public but especially to governments and policymakers.

"We can debunk fake news but we also need to bring good results using AI." – Expert 9

Promoting a more "aware" culture around AI through education, especially starting from an early age, can help ensure AI is better understood and used.

"We need a structured model, for example school curricula, to give them the context at an early age. It should be basic, common." – Expert 13

3.2.4. Discussion of the focus group input

The following aspects, extracted from the analysis of the focus group data (see Annex 2), are to be considered as background information for the planning, development, and implementation of the European AI Skills Strategy.

- The data gathered indicates that AI learning programmes can be more successful in keeping with the pace of the technological developments when focusing on the skills needs that persist over time.
- Experts estimate the multi-method approach to conclude on the AI skills needs in Europe to be fit-for-purpose.
- It has been found that the current AI learning offering is missing a stronger focus on foundational AI skills to extend its access to non-technical people.
- Experts hinted that there is a lack of harmonisation in the development of learning programmes for AI-related roles. EU standards are a critical element to ensure the same level of education quality across the EU.

- Industry and education representatives are to work together more closely to better align the AI educational offering with the needs of the market. Modes of cooperation can be enhanced to generate more value for both actors.
- Government policies can help drive the effort to develop AI skills, supported by third-party organisations and corporate training organisations.
- Data shows that promoting transparency in AI is a key success factor for increasing trust in the technology.
- Experts estimate that bringing concrete examples on how AI is useful and what risks it poses are key elements to promote and disseminate.

4. Recommendations

It is important to highlight that since the main aim of this consultation was to provide further input, suggestions, and recommendations for the maturation of the European AI Skills Strategy, this chapter presents a list of recommendations based on the results of the quantitative and qualitative research. This list aims at underlining the good practices, priority areas, and further supporting actions that can be considered for the improvement of the initial structure of the European AI Skills Strategy that can be translated into strategic objectives and supporting actions.

Topic	Recommendation
Collaboration in the field of AI	Fostering cooperation between government, academia, industry, and society in developing suitable AI learning offerings.
	Cooperation between experts from governments, corporates, SMEs, and AI-related professionals when defining the most sought-after skills in AI and use AI-powered tools.
	Providing an online community space for policymakers, industry, academia and NGO representatives, educators, and learners to share trustworthy and reliable information on AI.
Education and training	Developing AI curricula and programmes with foundational skills for all and more defined learning pathways for AI technical roles.
	Developing introductory materials to demystify AI for all and more particularly for school pupils.
Sustainability	Identifying and using National governments' grants and funding programmes and EU funding schemes to finance the implementation of the European AI Skills Strategy in EU countries.
	Advocating for new funding lines towards National governments to roll out the European AI Skills Strategy at the national level.
	Regular updating of curricula on AI in line with the technological developments that are identified as consistent over time.
	Participating in the discussion and work of EU standardisation bodies to support the elaboration of robust AI-related professional role profiles, through a CEN Workshop Agreement (CWA).

5. Conclusions

The conclusions of the two methods provide necessary feedback and insights on the initial structure, strategic objectives (SOs), and supporting actions of the European AI Skills Strategy to guide its maturation and inform future planning and decision-making on the implementation of the European AI Skills Strategy at the national and the EU levels.

- The methodological approach and research methods used to gather input on the European AI Skills Strategy's initial structure, as well as priorities, key enablers, and factors for its future implementation at the national and EU levels have proven to be adequate and the extensive data collected relevant for the purposes of the research.
- The analysis and discussions of the data collected through the two methods offer solid input that can be used as background information for the further planning, development and implementation of the European AI Skills Strategy. This information can also support the ARISA Alliance in rolling out the Strategy at the national level.
- The recommendations drawn are key practical pieces of advice that result from the main findings and discussion of the research. They can be used to mature the European AI Skills Strategy and more specifically refine the initial structure of the SOs and associated supporting actions.
- The main outcomes of this report together with the outcomes of D.3.1 constitute a useful and solid input for planning the ARISA Strategy, defining relevant SOs and key tasks for the ARISA Alliance.

6. Annexes

6.1. Annex 1: Questionnaire structure

6.1.1. Identification section – About you

What country do you live in? [List of Erasmus+ programme countries]

What is your age group?

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65 or over

Are you:

- Female
- Male
- Non-binary
- I prefer not to say

Which of the following is the main sector you are currently working in?

- Mining and quarrying
- Agriculture, forestry and fishing
- Water supply; sewerage, waste management and remediation activities
- Arts, entertainment and recreation
- Real estate activities
- Electricity, gas, steam and air conditioning supply
- Construction
- Public administration and defence
- Other professional activities
- Accommodation and food service activities
- Employment activities
- Technical, engineering and R&D activities
- Education
- Other service activities
- Financial and insurance activities
- Transportation and storage
- Wholesale and retail trade; repair of motor vehicles and motorcycles
- Human health and social work activities
- Information and communication
- Consultancy, marketing, accounting and legal services
- Manufacturing
- Administrative and support service activities
- Other

- I am not working at the moment

What is the highest level of education that you have attained?

- Doctorate degree
- Master's degree
- Bachelor's degree
- Associate degree
- Trade/technical/vocational training
- High school/college graduate, diploma or equivalent
- No formal degree or diploma
- I prefer not to say

How familiar are you with the basic principles of AI*?

*See OECD AI principles: https://oecd.ai/en/ai-principles

- Not at all
- Very little
- Somewhat
- To a great extent

Do you believe AI skills will be important for you professionally in the next 5 years?

- Very unlikely
- Unlikely
- Neutral
- Likely
- Very likely

6.1.2. AI Skills Strategy and drivers

1) Please rate the effectiveness of the current efforts to promote and develop AI skills in your country:

- Not effective at all
- Slightly effective
- Neutral
- Very effective
- Extremely effective

Please provide a brief explanation of your choice: [Open ended answer]

2) In your opinion, what are the key sectors driving AI skills development in your country? *between 1 and 5 choices*

- Mining and quarrying
- Agriculture, forestry and fishing
- Water supply; sewerage, waste management and remediation activities

- Arts, entertainment and recreation
- Real estate activities
- Electricity, gas, steam and air conditioning supply
- Construction
- Public administration and defence
- Other professional activities
- Accommodation and food service activities
- Employment activities
- Technical, engineering and R&D activities
- Education
- Other service activities
- Financial and insurance activities
- Transportation and storage
- Wholesale and retail trade; repair of motor vehicles and motorcycles
- Human health and social work activities
- Information and communication
- Consultancy, marketing, accounting and legal services
- Manufacturing
- Administrative and support service activities
- Other

3) Which of the following areas should be prioritised in the implementation of a European AI Skills Strategy*? *between 1 and 3 choices*

*The European AI Skills Strategy aims to tackle the lack of AI skills in Europe.

- Creation of AI education and training programmes
- Boost upskilling and reskilling initiatives for the workforce
- Develop collaborative research & development projects
- Strengthen partnerships between academia and industry
- Joint communication, dissemination and awareness-raising activities
- Develop a strong Alliance with partners from all EU countries
- Reach a major step increase in the technological maturity of AI-based solutions

4) In your opinion, what are the key funding schemes that can considerably help the successful implementation of the European AI Skills Strategy in your country? *between 1 and 2 choices*

- National government grants and funding programmes
- European grants and funding programmes
- Industry grants and sponsorships
- Venture capital funds
- Other

5) These are some key enablers for the development of AI skills in Europe. Please select the 3 most important ones for your country: *between 1 and 3 choices*

- Collaboration between education and industry actors
- Creation of AI-specific educational programmes and courses
- Support for AI-related start-ups and entrepreneurship
- Company incentives for AI professional certifications
- Integration of an AI educational component into existing curricula & programmes

- Public awareness and engagement campaigns
- Promotion of ethical, trustworthy AI practices

Please share any other suggestions or examples: [Open ended answer]

6) In your opinion, who should be the main drivers of implementation of the European AI Skills Strategy in your country: *between 1 and 2 choices*

- Government and public organisations
- Education and training organisations
- Companies
- Non-Governmental Organisations
- Industry representative bodies
- Other

7) In your opinion, what are the best ways to stay (or become) informed on AI in a business or policy context? [Open ended answer]

6.2. Annex 2: Focus group proceedings

The ARISA Focus Group has been organised by DIGITALEUROPE (DE) in the context of the EU-funded project ARISA (ARtificial Intelligence Skills Alliance) on Tuesday the 11th of July 2023 from 10:00-12:00 CEST/Brussels time.

The Focus Group was composed of 20 experts from 14 European countries (Belgium, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, The Netherlands, Poland, Portugal, Romania, Slovenia, and Spain) representing industry (35%), civil society (15%), and the education and training (25%) and public (25%) sectors. They gave their input on strategies to increase Artificial Intelligence knowledge and skills in Europe.

The results helped to enhance and validate the overall approach of the European AI Skills Strategy – one of ARISA's project outputs. The input received by the experts has been anonymised.

DE collaborated with ARISA project partners – the University of Applied Sciences Utrecht (HU), Digital Technology Skills Limited (DTSL), and Universidad Internacional de la Rioja (UNIR) – in the preparations, delivery, and writing of the proceedings of the Focus Group.

6.2.1. Agenda

10:00-10:10	**Opening remarks & Tour de table** (José Usero, DIGITALEUROPE)
10:10-10:20	**About the ARISA project** (José Usero, DIGITALEUROPE)
10:20-10:30	**ARISA Skills Needs Analysis: Key results** (Carmel Somers, Digital Technology Skills Limited)
10:30-11:55	**Structured discussion: The European AI Skills Strategy: A stepwise approach** (José Usero, DIGITALEUROPE & Willemijn van Haeften, University of Applied Sciences Utrecht)
11:55-12:00	**Closing** (José Usero, DIGITALEUROPE)

6.2.2. Participants

Name	Organisation	Country
Carmel Somers	Digital Technology Skills Limited (DTSL)	
David Fitzgerald	Digital Technology Skills Limited (DTSL)	
Jose Martinez-Usero	DIGITALEUROPE (DE)	
Kelly Ernest	University of Applied Sciences Utrecht (HU)	
Marie Montaldo	DIGITALEUROPE (DE)	
Pascal Ravesteijn	University of Applied Sciences Utrecht (HU)	
Stefania Aceto	Universidad Internacional de La Rioja (UNIR)	
Wiktoria Orlowska	DIGITALEUROPE (DE)	
Willemijn van Haeften	University of Applied Sciences Utrecht (HU)	
Expert 1	EAS - KREDEX	Estonia
Expert 2	Adecco Group	Italy
Expert 3	Intel Corporation	Portugal
Expert 4	UNE - Asociación Española de Normalización	Spain

Expert 5	University of Applied Sciences Utrecht	Netherlands
Expert 6	HeadAI	Finland
Expert 7	Science View	Greece
Expert 8	Digital Citizens Romania	Romania
Expert 9	Save the Children Italy	Italy
Expert 10	AGCOM - The Italian Communications Regulatory Authority	Italy
Expert 11	IBM	Ireland
Expert 12	Ministry of Digital Transformation	Slovenia
Expert 13	STX Next	Poland
Expert 14	Dell Technologies	Belgium
Expert 15	Simplon	France
Expert 16	PROMEA	Greece
Expert 17	Neumann Nonprofit Ltd. / AI Coalition of Hungary	Hungary
Expert 18	Siemens Healthineers	Belgium
Expert 19	University of the Aegean	Greece
Expert 20	NLB Group	Slovenia

6.2.3. Focus group Proceedings

6.2.3.1 Opening remarks and the ARISA project

José Usero (DE), ARISA project coordinator, welcomed participants to the ARISA Focus group and presented the agenda of the day. He explained that the meeting would be recorded for internal purposes only (drafting of the minutes) and that experts are invited to express their opinions freely as their contribution will be anonymised in the Focus Group Proceedings.

He continued with a short presentation of the ARISA project, an Erasmus+ Sector Skills Alliance focusing on Artificial Intelligence (AI). He explained the scope of the Focus Group, organised to get the feedback of experts on the overall approach and Strategic Objectives (SOs) of the European AI Skills Strategy which will be released in Autumn 2023.

A tour de table followed so that participants could introduce themselves (see list of participants in section 2). At the end of the round of introduction, **José Usero** invited **Carmel Somers** (DTSL) to give experts an overview of the main results of the ARISA AI Skills Needs Analysis report. This introduction would give background information to the experts to be able to understand in more depth what are the most needed AI skills and roles in Europe.

6.2.3.2 ARISA Skills Needs Analysis: Key results

Carmel Somers presented the main results of the AI Skills Needs Analysis report. She explained that the Needs Analysis uncovered the critical AI skills gaps between the market needs and the educational offerings in Europe and helped to i) better understand the AI-related roles, ii) identify the skills needs and gaps, and iii) assess the availability of the existing AI skills learning programmes.

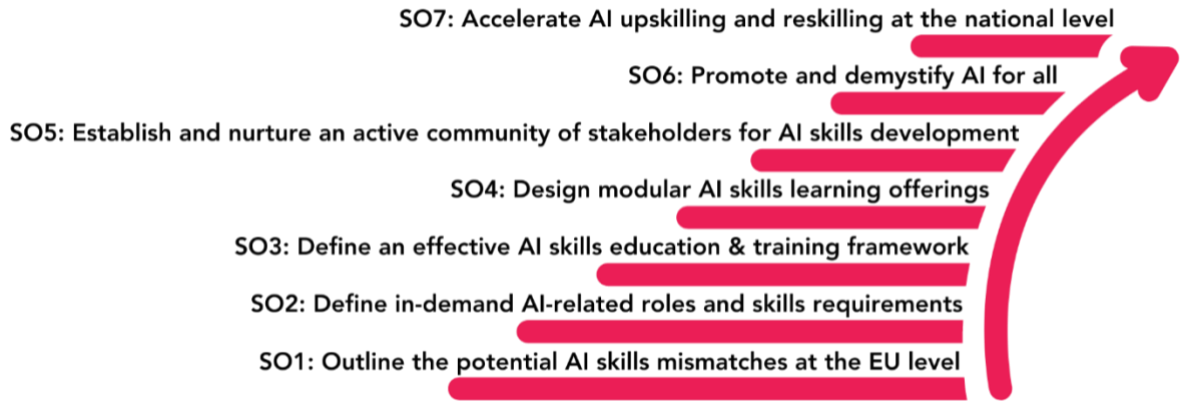
She mentioned Europe's need in terms of AI-related roles is twofold. On the one side, there is a clear need for AI technical roles (e.g., AI practitioners, AI management and support) and on the other side, the report has helped observe a clear need for AI non-technical roles (e.g., Decision makers and Policymakers), i.e., roles that demand an understanding of AI. She also presented a summary of the

skills requirements for each of those roles. She concluded on the main findings of the Needs Analysis report, highlighting priorities to address both the skills and learning offering gaps.

6.2.3.3 Structured discussion: The European AI Skills Strategy: A stepwise approach

Following these introductory sessions, **Willemijn van Haeften** (HU) introduced the structured discussion on the European AI Skills strategy, explaining that seven Strategic Objectives (SOs) have been identified by ARISA and that for each objective the comments, feedback, and suggestions of participants would be welcomed.

José Usero moderated the discussion around each of the SOs.



The first SO of the ARISA AI Skills Strategy was presented by **Willemijn van Haeften** (see below).

SO1: Outline the potential AI skills mismatches at the EU level
Supporting actions
1.1. Analyse AI skills requirements in job postings in the EU, using an AI tool. 1.2. Analyse the AI skills learning offerings in the EU. 1.3. Define the framework and modalities for effective periodical updates and monitoring.

Experts were asked whether they could suggest complementary supporting actions that could help ensure ARISA captures the most accurate picture of the AI skills mismatches in the EU.

- **Expert 13** highlighted that the biggest challenge nowadays is the speed of change, so change management becomes a priority. Capturing the most accurate picture of the AI skills mismatches implies the capacity to identify what is at a mature stage (and therefore should be closely monitored) and what is still at an initial stage (and potentially could disappear or stay, and therefore does not represent a critical priority element to be monitored). *"What we are talking about today will be very different in a year from now. What's going to remain with us? What's in a developing phase, and what will be dropped? We should focus on the things that are going to stay with us. That's the challenge"*.
- **Expert 6** recommended widening the spectrum of analysis and monitoring and extending it from job postings to other valid datasets such as research and investments in AI and to monitor also what is happening within companies. *"AI skills requirements are rapidly*

changing. Open the analysis from job posting to research, investments – those types of datasets that can also be valuable for us and tell us where is the interest of corporates and organisations in the near future". Also, she suggested modernising stakeholders' consultation methods to validate the Needs Analysis by integrating traditional focus groups and meetings with a more collaborative and dynamic model to ensure we establish a sustainable, win-win collaboration with experts.

- **Expert 15** highlighted that monitoring of AI skills mismatches evolution could be AI-assisted and should happen daily to capture change signals. She reported that her organisation carries out monitoring and analysis of AI skills mismatches based on job postings. This analysis is combined with dialogues with companies, and more specifically people working in AI-related roles, which provide a more qualitative picture of the evolution and help in giving a clearer idea of skills mismatches. *"We tend to try to have a couple of in-depth exchanges with someone who is working in an AI role or leading an AI team and the information we get there is a lot more qualitative and gives us a clearer idea of what specific mismatches exist."*
- **Expert 5** recommended consulting a variety of stakeholders including organisations that develop or deploy AI solutions, as well as users' organisations and to include within the latter those organisations that although having to deal with AI solutions do not know much about AI. *"Talk to stakeholders in different organisations where the solutions are deployed. These are organisational stakeholders but also, in my case, end-users – people who are exposed to these."*

José Usero thanked all experts for their input on SO1 and explained that ARISA intends to use a combined approach with different methods: i) automatic/AI-assisted monitoring, and ii) national expert groups to gather information and discuss country-specific skills gaps. ARISA believes this holistic approach will help identify where are the skills mismatches and develop learning offerings in these specific areas.

The second SO of the ARISA AI Skills Strategy was presented by **Willemijn van Haeften** (see below).

SO2: Define in-demand AI-related roles and skills requirements
Supporting actions
2.1. Define an AI skills framework. 2.2. Strive for the integration of AI skills into existing European roles and skills frameworks and standards (e.g., eCF, ESCO) for EU-wide recognition. 2.3. Establish a working group of experts to explore and validate current and emerging AI skills and role trends at the EU level.

José Usero explained that the Needs Analysis has highlighted an urgent need for three main kinds of skillsets and related learning programmes: i) basic AI knowledge for policy- and decision-makers, ii) AI Advisory course, and iii) Prompt engineering comprehensive course.

Experts were asked to comment on the learning programmes that they consider are to be delivered more urgently. They were also asked how Member States should localise such programmes and how to design a framework that is at the same time flexible enough to be updated to respond to emerging skill needs and easily can be adapted to local needs.

A further issue which was discussed was whether to link the emerging AI skills to existing competence (eCF/ESCO) and standardisation frameworks.

- **Expert 4** suggested using the eCF competence framework to facilitate the harmonisation between the EU Member States and to participate in the CEN technical committee (TC 428). Considering that eCF and ESCO and not complete enough for AI-related roles, he suggested using the CEN CENELEC standardisation framework, and referred to the CEN workshop agreement (pre-standardisation agreement) as a good track for fast-paced projects like ARISA. He highlighted that the HS Booster can provide this service for free and that the timeframe for a workshop agreement is 3-6 months versus 2 years for standards and could therefore be relevant for ARISA.
- **Expert 5** suggested designing programmes that manage to combine hard and soft skills by designing learning pathways that integrate one with the other seamlessly for the learners. *"We focus on the things that don't get "old" so quickly which are more fundamental skills. We try to move away from this distinction between soft skills and hard skills"*.

José Usero informed the group that ARISA is establishing a working group of experts to explore and validate current and emerging AI skills and role trends at the EU level and asked what organisations the experts would you expect to see at the table.

- **Expert 1** recommended that the big companies and SMEs are represented: *"If the learning providers are not fulfilling the needs of companies, it won't work"*.
- **Expert 9** suggested including *"politicians and lawyers to understand how Members States, governments could approach these AI trends"*. She mentioned that it would be beneficial to talk with governments about their educational framework and how to expand the use of the AI skills framework.

The third SO of the ARISA AI Skills Strategy was presented by **Willemijn van Haeften** (see below).

SO3: Define an effective AI skills education & training framework
Supporting actions
3.1. Translate the demand's AI skills needs into educational profiles. 3.2. Map existing upskilling and reskilling initiatives to draw lessons from their implementation. 3.3. Design a European AI skills certification framework and accreditation procedures, including possible ways of implementation.

Experts were asked whether it would be better to opt for a European Certification model or to act locally.

- **Expert 4** replied that, although for sure an EU-centralised certification model would be better for users, there would be legal problems with its implementation and that the solution could be to harmonise through common standards at the EU level with certification managed at the local level. Details about the certification could be included in the CEN workshop agreement though only a reference to the general scheme of certification would be mentioned. He informed that the existing European Technical Committees (TCs) are

willing to receive input from experts, which is required to develop market-relevant standards. There are currently two TCs related to this topic: the CEN/TC 428 on ICT Professionalism and Digital Competences and the CEN-CENELEC JTC 21 on Artificial Intelligence.

The fourth SO of the ARISA AI Skills Strategy was presented by **Willemijn van Haeften** (see below).

SO4: Design modular AI skills learning offerings
Supporting actions
4.1. Deliver a fit-for-purpose core curriculum for AI skills across the EU. 4.2. Widen access to AI skills learning offerings and extend to non-technical people (e.g., online degrees or blended education, MOOCs). 4.3. Support the continuous development of trainers. 4.4. Foster diversity and inclusion within AI skills training, using different delivery methods and adapting the material to a diverse group of users.

Participants were asked to comment on how to widen access to AI learning offerings and reach non-technical people. They were also asked how important trainers' training is in AI and whether AI assistive tools could be used for training and training material development.

- **Expert 15** suggested the way learning programmes are designed is important to widen access to AI skills training. She mentioned it is important to focus on core AI skills at the beginning of the training (i.e., fundamental data skills), especially for people who don't require a substantial level of AI knowledge in their (future) role, and then have different, more specialised paths for those who want to deepen their knowledge and/or become AI professionals. Furthermore, she mentioned that *"For the train-the-trainers, we talk about how to use these [AI] tools within the training programmes for learners to use them autonomously"*.

The fifth SO of the ARISA AI Skills Strategy was presented by **Willemijn van Haeften** (see below).

SO5: Establish and nurture an active community of stakeholders for AI skills development
Supporting actions
5.1. Grow a sustainable ARISA Alliance network of associated partners with balanced geographical representation. 5.2. Develop new collaboration avenues between industry, academia, and governments for AI skills development, with links to policy developments (e.g., AI Act). 5.3. Develop a value proposition to engage and support companies, learning providers, and public organisations in sustainable skills development activities.

Experts were asked to reflect on how this community could look like.

- **Expert 9** suggested involving community members online and organising face-to-face events as well to strengthen the relationship among community members. She also recommended NGOs as a relevant stakeholder category to be involved in their work on inclusion and ethical aspects related to AI.

José Usero commented that very soon ARISA will offer external stakeholders the opportunity to join as an Associated Partners and that it will be key to identify the motivation that will encourage stakeholders' participation and engagement in the ARISA Alliance.

The sixth SO of the ARISA AI Skills Strategy was presented by **Willemijn van Haeften** (see below).

SO6: Promote and demystify AI for all
Supporting actions
6.1. Raise awareness about AI principles among the general population. 6.2. Debunk "fake news" about AI. 6.3. Promote AI as a career.

Experts were asked how the trustworthy use of AI could be promoted.

- **Expert 9** stated that good experiences in using AI should be promoted: "*We can debunk fake news but we also need to bring good results using AI*".
- **Expert 13** stated that more awareness (also among governments) should be raised on how AI is used in the business environment.
- **Experts 1, 12, and 13** agreed on the need to focus on K-12 education and start raising awareness on AI and its potential from an early age to promote a more "aware" culture about AI. It was suggested to look at ongoing projects and practices on how to introduce AI in primary and secondary schools and how to train teachers for this. *"We need a structured model (e.g., school curricula) to give them the context at an early age (it should be basic/common)*".
- **Expert 2** stated that "*We need to build culture [and] a mechanism that can bring people to use AI and let them know there are problems but also opportunities in AI. We have to stress the fact that there are good and bad sides. We cannot hide anything."*

The seventh and last SO of the ARISA AI Skills Strategy was presented by **Willemijn van Haeften** (see below).

SO7: Accelerate AI upskilling and reskilling at the national level
Supporting actions
7.1. Advance the narrative on AI upskilling and reskilling with national and local governments to ensure bottom-up approach. 7.2. Map and promote funding opportunities for AI skills development across the EU. 7.3. Capacity building to key stakeholders to engage the national and local communities in accelerating AI skills development.

No comments were made from experts on this topic.

6.2.3.4 Closing of the Focus Group

Jose Usero thanked all participants for their valuable input and informed them that their contribution will help the finalisation of the ARISA AI Skills Strategy that will be published in Autumn 2023.

Artificial Intelligence Skills Alliance

www.aiskills.eu

info@aiskills.eu

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.